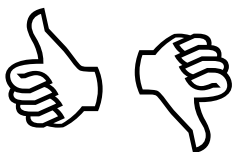


## **AP226 Expert Working Groups Workshop No.3**

Held on 3-4 July 1997 at Lloyd's Register House,  
Croydon, UK



### **Minutes of the Meeting**

#### **Present:**

Z Bazari (Chairman)	Lloyd's Register (UK)
K Brownlie	Consultant (UK)
P Fitzsimmons	Lloyd's Register (UK)
J Flarup	Odense Steel Shipyard (Denmark)
J Fransman	Kvaerner Masa-Yards (Finland)
J Freeman	Lloyd's Register (UK)
H Johansson	KaMeWa (Sweden)
R Krapp	Germanischer Lloyd (Germany)
J Hardenburg	Ministry of Defence (UK)
D Radosavljevic	Lloyd's Register (UK)
S Ruud	Det Norske Veritas (Norway)
J C Thomson	Wartsilla NSD (Switzerland)
S Wurst	BIBA (Germany)
T Yaghmai	Bureau Veritas (France)

#### **Apologies:**

J Clayton	Stone Manganese Marine (UK)
K Gibbons	British Marine Equipment Council (UK)
A Mechsner	HDW (Germany)

#### **1. Welcome and Introduction**

The meeting was opened at 11.00 am by Dr Z. Bazari, welcoming the participants and thanking them for their participation. He passed on apologies on behalf of those who expressed interest in attending but could not do so because of other business engagements (see list above).

Participants then briefly introduced themselves and their organisations.

#### **2. Minutes of Previous Workshop**

The minutes of Workshop No. 2 were approved with one amendment to Page 11, item 3, bullet point 2 which should read ".....involved during pre-order stage" instead of ".....involved during this stage".

### **3. Actions Due to Workshop No. 2**

A walkthrough of the action list of Workshop No. 2 was conducted. It was agreed that the majority of the actions had been completed.

### **4. Project Progress Statement**

The following statement on AP226 progress was provided by Dr Z. Bazari:

- The majority of actions of Workshop No. 2 have been completed.
- The breakdown structure and definitions, as agreed in Workshop No.2, have been documented.
- The Working Draft of AP226 has been prepared and submitted to ISO TC184 SC4.
- Liaison with external projects such as POSC/CAESAR and also ISO STEP (Ship APs, Process Plant APs and AP208) has continued.
- The EDIMAR project has progressed and preliminary work on an implementation scenario involving “ deck cranes” has been initiated.

### **5. AP226 Working Draft**

The “AP226 Working Draft” was handed over to participants. An in-depth presentation of the report was then conducted. Issues were discussed, together with decisions and actions (the list of actions is given in section 9). The presentation included the following items:

- Introduction to data modelling and EXPRESS-G;
- Mechanical product type hierarchy;
- Definitions type hierarchy;
- AP226 data planning model;
- AP226 Units of Functionality (UoFs).

The following issues were raised in this session and were discussed:

- The AP226 Team follows the rules and procedures laid down by ISO in documenting the standard, including EXPRESS-G diagrams, alphabetic order of definitions, UoFs, Application Objects and Application Assertions.
- The type hierarchy of mechanical product for equipment and component needs expansion to include all of those which are in the scope of AP226.
- The list of equipment and components bears similarities to the work being carried out under POSC/CAESAR and in this area collaboration with this project will be useful.
- AP226 Team should find a simple way of presenting the inherited attributes (mainly from abstract and generic entities), since the data model diagrams in their present form are difficult for application experts to follow.

Based on the presentation and discussion, it was agreed that:

- The developed type hierarchies seem to be reasonable and application experts do not find difficulty in relating mechanical products and their definitions to these type hierarchies.
- The overall logic behind distributing generic attributes in high level UoFs is reasonable. However, all these attributes needs to be presented in a simpler form.

## **6. Presentation on Norwegian programme on “Information Technology in Ship Operation”**

Mr Stian Ruud (DNV) made an overview presentation on the above initiative, which began in 1994 and will end in 1997. A number of projects have been carried out within this programme, on various aspects of ship operation.

Project F1 entitled “IT Standards”, has concentrated on demonstrating practical data exchange based on EXPRESS/STEP techniques through a series of implementations. The basis of the developed data models for these implementations was described and its relation to future standardisation activities was clarified.

At the end of the presentation, it was agreed that the equipment and machinery data, identified within the F1 project, should be analysed by the AP226 team to see whether they fit into AP226 data model or not.

## **7. Presentation on EDIMAR project**

Mr Stephan Wurst (BIBA) made a presentation on the EDIMAR (Electronic Data Interchange in European MARitime Industry) project. His presentation included:

- The scope of the EDIMAR project is primarily EDI and supports the AP226 standard for exchange of engineering data.
- The partners include shipyards (4), suppliers (2), research organisations (2), class society (1) and software vendors (2).
- Development and pilot implementation of AP226 is supported within this project. The pilot implementation will be carried out using a “crane” as the product.
- Data modelling of the “crane” will be carried out within EDIMAR.

At the end of presentation, it was agreed that the AP226 element of EDIMAR and its progress will be presented in the forthcoming workshops. It was noted that there may be a need for a Crane EWG as the work within EDIMAR progresses.

## **8. Parallel Meetings of EWGs**

The following EWGs held their own meetings on 4 July 1997 (10.00 am to 1.00 pm):

- EWG1 - Diesel Engine
- EWG2 - Propulsor
- EWG3 - Mechanical Transmission System

Minutes of these meetings are given in Appendices 1 to 3 respectively.

## **9. Outline List of Actions**

The following list of actions was agreed.

<b>Code</b>	<b>Description</b>	<b>Action</b>
EWG2.7	AP226 Team to prepare a couple of examples showing the use of a 'Connector' (carried over from Workshop 2).	LR
EWG2.10	The question of "deck machinery", and the proposed change to include cargo handling equipment, to be investigated and a proposed solution is to be presented to next workshop.	BV/LR
EWG3.1	Following action EWG2.2, an "out of scope" statement on Nuclear Stream Plant to be prepared by LR and confirmed by MoD.	LR/MoD
EWG3.2	LR and DNV to examine the data needed for exchange within the "Information Technology in Ship operation Project" and clarify how AP226 can represent such data.	LR/DNV
EWG3.3	Examples of the use of "connector" and "connection" to be documented and circulated to participants for discussion at the next meeting.	LR
EWG3.4	Progress on the EDIMAR project and data modelling for the "Crane" to be reported at the next meeting.	BIBA
EWG3.5	AP226 Working Draft to be reviewed formally using the RFC document PE_5220_TID_RFC2. Comments back to LR by 22nd August 1997.	ALL
EWG3.6	The documents for each Workshop to be distributed to participants before the meeting, where possible.	LR
EWG3.7	Standard definitions on Propulsors, where available, to be forwarded to LR.	MoD

Details of the action list for each EWG are given in Appendices 1 to 3.

#### **10. Date and Place of Next Meeting**

Next meeting is scheduled for 30 and 31 October 1997 and will take place at LR Croydon, UK.

**Appendix 1**  
**Minutes of 3rd meeting of**  
**AP226 Diesel Engine Expert Working Group**  
**3-4 July 1997**

**Present:** Z Bazari (LR - Chairman), J Fransman (KMY), S Ruud (DNV), J Thompson (W-NSD), S Wurst (BIBA) and T Yaghmai (BV).

This meeting took place on 4 July 1997 from 10.00 am to 1.00 pm at Lloyd's Register, Croydon, UK.

**1. Introduction**

Z Bazari opened the meeting with a brief discussion on "Data and Attributes" for diesel engines and their representation in AP226 UoFs.

**2. Minutes of Previous Meeting and Actions**

The minutes of previous meeting were approved. A review of action list was conducted and the actions not completed were carried forward.

**3. Discussion of Issues and Comments on diesel engine Unit of Functionality**

Most of the meeting time was devoted to a discussion on the AP226 Working Draft and how newly identified diesel engines data can be represented in the diesel engine data model. An exercise was conducted by selecting the following data and locating them in the data model. The data included:

- |  |                                |
|--|--------------------------------|
| • Main engine speed                            | • Engine running hours         |
| • Fuel oil T and P                             | • Engine room T and P          |
| • Exhaust out let T for cylinder No. 1         | • Cylinder combustion pressure |
| • Exhaust emission levels                      | • Engine centre of gravity     |
| • Natural frequency of the engine installation |                                |

The above exercise showed that:

- The current AP226 structure could cope with addition of the above parameters to the model.
- It was noted that some of the above attributes are not of simple types. For example, combustion pressure varies as a function of crank angle and it must be clearly stated whether the full pressure diagram or pressure at certain point in the engine cycle is needed.

- It was agreed that if all the “data and attributes” could be identified, then their inclusion into AP226 could be carried out relatively quickly.
- The question was raised of allocating different values to a single parameter (such as maximum, minimum, mean, measurement tolerance, etc). As this is a general issue, and may be complex to deal with, further work is needed in order to clarify the issue.

#### **4. New engine suppliers**

The need for participation of more engine suppliers in this EWG was briefly discussed. It was noted that Störk Wartsila and Ulstein Bergen have been approached in the past. It was agreed that they should be contacted for possible participation in the Diesel Engine EWG.

#### **5. List of Actions**

<b>Code</b>	<b>Description</b>	<b>Action</b>
EWG2.14	The “New Building Machinery Database” exchange scenario to be investigated and documented (carried over from 2nd meeting).	HDW
EWG3.8	Data and attributes for diesel engine are to be sent to LR for inclusion in AP226.	W-NSD
EWG3.9	The diesel engine UoF to be reviewed and comments provided to LR.	ALL
EWG3.10	DNV to investigate an implementation scenario involving one of those in F1 project, but this time using AP226.	DNV
EWG3.11	The question of multiple representation of a single parameter (to represent maximum, minimum, mean, ..... ) to be investigated.	DNV/LR
EWG3.12	LR to include type approval data in AP226 and advise BV accordingly.	LR
EWG3.13	Ulstein Bergen to be contacted for joining the Diesel Engine EWG.	DNV
EWG3.14	Störk Wartsila (Mr Waatewijn) to be contacted for joining the Diesel Engine EWG.	W-NSD

**Appendix 2**  
**Minutes of 3rd meeting of**  
**AP226 Propulsor Expert Working Group**  
**3-4 July 1997**

**Present:** K Brownlie (WG Chairman), P A Fitzsimmons (LR),  
J Hardenberg (MOD), H Johansson (KaMeWa)  
**Apologies:** J Clayton (SMM).

This meeting took place on 4 July 1997 from 10.00 am to 1.00 p.m. at Lloyd's Register, Croydon, UK.

Mr K. Brownlie opened the meeting and the following were discussed:

**1. Minutes of the Previous Meeting**

The minutes of the previous meeting were discussed and the members agreed that they were an accurate record of the discussion in the previous meeting. It was noted, however, that Cycloidal units should be referred to as Cycloidal Propellers. A review of the list of actions revealed that the MIT document had not reached the working group members. This was rectified.

In discussion of the definitions of propulsors, the group considered that some were still cumbersome. J Hardenberg agreed to consult the US NIDDESC documents for relevant definitions and other information.

H Johansson contributed lists circulated to KaMeWa's customers at the pre-bid stage in relation to information required for model testing of propellers and rotatable thrusters.

**2. Propulsor Breakdown Structure**

The group considered the Section 8 of the Industry Review Report, TID\_PE5220\_IRR\_1 (20/Feb./97) dealing with the comments received on the breakdown structure of the propulsor as a result of review since the last EWG meeting. It was agreed that KaMeWa would consult the ISO CD (3715) for definitions, and a request was made to consult SNAME documents.

The group considered how far one needed to go in defining level 4 of the breakdown structure, especially in view of the diversity and complexity of units such as the controllable pitch propeller (CPP). Mr Fitzsimmons indicated that he had taken manufacturers lists of components for a waterjet and a CPP in order to gain an appreciation of the type and extent of the data which was currently exchanged between propeller manufacturers and Lloyd's Register. Dr Hardenberg indicated that many of the lowest level components in engineering systems, had been given unique identifying codes, termed Global Unit Identifiers. He undertook to supply some information on this international cataloguing system.



### 3. Screw propeller UoF

It was agreed that proposed scenario as documented in TID\_PE5220\_UG1, could serve the purpose of identifying Functional Unit's attributes. The group considered adding a new item "Naval Pump Jet" to the propulsor breakdown structure, since this multi-bladed impeller could have inlet or outlet stationary guide vanes, or both.

Some time was given to introducing the new members to the concepts of the Express-G process and its graphical interpretations.

### 4. Data and Attributes

The graphical representations of UoFs were discussed, e.g. Figure G.11 in ISO/WD 10303-226(E), for the Screw\_propeller UoF. These were found to difficult and time consuming to assimilate. The group considered that it was difficult in this format to identify what attributes, if any, were missing, particularly since inherited attributes were not explicitly defined. Figure L3 was also considered and the group considered that additional boxes, such as 'gas turbine' should be added to the figure.

Mr Fitzsimmons undertook to extend his tabular definition approach to include the inherited elements and to circulate these data, taking the example of the "prepare bid" stage, for comment by the EWG members. This was considered by the group to be helpful in allowing them to register comments on the working documents.

Dr Hardenberg raised the question of Diesel-electric propulsion, in particular the static converter. He undertook to provide some data on this device.

### 5. List of Actions

<b>Code</b>	<b>Description</b>	<b>Action</b>
EWG3.15	Issue the MIT document on propulsors to all EWG members.	LR
EWG3.16	Complete the new 'breakdown structure' for propulsors.	LR
EWG3.17	Consult NIDDESC definitions for propulsors.	MoD
EWG3.18	Consult ISO-CD3715 definitions for propulsors.	KMW
EWG3.19	EWG members to consider the propulsor breakdown structure and communicate to LR.	ALL
EWG3.20	Complete UoF tabular formats and circulate to EWG in electronic format.	LR
EWG3.21	Consider implications for breakdown structures occasioned by Diesel-electric equipment such as 'static converters'.	MoD

**Appendix 3**  
**Minutes of 3rd meeting of**  
**AP226 Transmissions Systems Expert Working Group**  
**3-4 July 1997**

Present: J Freeman (LR - Chairman), R Krapp (GL), J Flarup (OSS),  
D Radosavljevic (LR)

This meeting took place on 4th July 1997 from 10.00 am to 1.00 pm at Lloyd's Register, Croydon, UK.

### **1. Minutes of Previous Meeting**

The minutes of the previous meeting were accepted.

### **2. Matters Arising**

EWG 2.22 (Definitions) Action Complete. Proposed amendments to the Mechanical Transmission System Breakdown Structure incorporated.

EWG 2.23 (Muff Coupling - Flanged Type) Action Complete. Proposed definition agreed and included in Mechanical Transmission System Breakdown Structure.

EWG 2.24 (Interface with CPP System) Action Complete. Proposed interface accepted.

EWG 2.25 (ISO Definitions) Action Continues. GL and LR had generated lists of applicable standards. Where possible ISO standard definitions will be used in Breakdown Structure.

EWG 2.26 (Approach to Breakdown Structure) Action Complete. 'Toolbox' approach adopted for Mechanical Transmission System Breakdown Structure.

EWG 2.27 (Consistency of Approach with Related Industries) Action continues. As transmissions system technology is common across many industries it was desirable to gain visibility of work being done within the automotive, aircraft, process/ industrial STEP Communities. A common approach across all industrial sectors would be advantageous. LR agreed to investigate the feasibility of accessing information via the STEP website.

EWG 2.28 (Control System) Action Complete. Action taken by LR (ZB) to include at Propulsion System level.

EWG 2.29 (Industry Involvement) Action Continues. This item was discussed in some detail. It was agreed that wider industry involvement was now essential and a formal approach was needed. See proposed way forward under para 4 below.

EWG 2.30 (Connectivity with Ship's Structure) Action Complete. EWG suggestions had been accepted by LR (ZB).

EWG 2.31 (Connectivity with Prime Mover & Propulsor/ Load) Action Complete. EWG suggestions had been accepted by LR (ZB).

EWG 2.32 (Pre-installation Data Exchange Scenario) Action Complete. EWG suggestions had been incorporated by LR (ZB).

EWG 2.33 (Data Exchange Scenario - Post Installation) Action Complete. EWG suggestions had been incorporated by LR (ZB).

### **3. Discussion of AP226 Working Draft and UoFs Relevant to Transmissions Systems Expert Working Group**

Working Draft ISO/WD 10303-226(E) dated 1997-06-01 was discussed and the following preliminary proposals were agreed:

Figure G.10 - Graphical representation of transmission-system UoF The need to include alignment, dynamic response, limits and barred ranges under both design\_functional\_characteristics and operational\_characteristics was agreed.

Figure L.4 - AP226 Product Definition Type Hierarchy The need to include "Alignment" and "Finite Element" under Engineering\_analysis\_definition was agreed. The data arising from alignment analysis, e.g. bearing off-sets, bearing reactions, etc. would need to be included under Physical\_definition. The configuration of the propulsion system (i.e. number of prime movers per shaft, prime mover power and speed, PTO/ PTI power, speed and location, Ice Class, number of propellers, propulsion operating modes, etc.) was also key information for the transmission system and would need to be included; this could be at Propulsion System level.

### **4. Transmissions Systems Attribute List - Review & Industry Feedback**

A discussion of the Level 2 Transmissions System Attribute List then followed. An attempt was made to categorise each attribute under a Product Definition Type and some progress was made. In cases where an attribute might come under two or more Product Definitions the likely data exchange context was considered carefully and the attribute assigned accordingly (For example, "bearing length" could be considered as a design\_functional\_characteristic and a geometric\_definition. As bearing length data was only likely to be exchanged between organisations as geometric information, the attribute was assigned to geometric\_definition). It was agreed that this approach should be continued for all attributes in conjunction with a full review of the attribute list. Group members agreed to submit their proposals to LR. LR would then co-ordinate the preparation of a Request for Comments form for industry and forward to OSS and GL for industry dissemination in their areas as agreed. LR would co-ordinate dissemination within UK.

## 5. Outline List of Actions

<b>Code</b>	<b>Description</b>	<b>Action</b>
EWG3.22	Available ISO definitions to be re-used for data definitions.	LR
EWG3.23	Consistency of approach with related industries to be investigated (STEP approach)	LR
EWG3.24	Graphical representation of transmission-system UoF to be enhanced to include new requirements.	LR
EWG3.25	AP226 product definition type hierarchy to be enhanced.	LR
EWG3.26	Transmissions systems attribute list-review & industry feedback to LR.	GL, OSS, LR

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